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## 1997 Decisions

## Opinions of the United States Court of Appeals for the Third Circuit

10-17-1997

# Kannankeril v. Terminix Intl Inc

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Filed October 17, 1997

UNITED STATES COURT OF APPEALS  
FOR THE THIRD CIRCUIT

No. 96-5818

CHARLES KANNANKERIL; MARY KANNANKERIL,  
individually and as next friend of Charlene and  
Crystal Kannankeril; CHARLENE KANNANKERIL;  
CRYSTAL KANNANKERIL

v.

TERMINIX INTERNATIONAL, INC.; TM SPECIAL  
PARTNERS, INC.; TERMINIX MGP, INC., General Partners  
of the Terminix International Company Limited  
Partnership; TERMINIX INTERNATIONAL; DOW  
CHEMICAL U.S.A.; WHITMIRE RESEARCH  
LABORATORIES, INC.; FORD CHEMICAL & SERVICE,  
INC.; DENNIS BUTTIMORE, c/o Terminix International;  
THE TERMINIX INTERNATIONAL COMPANY  
LIMITED PARTNERSHIP

Mary Kannankeril, Individually and as  
Next Friend of Charlene Kannankeril,

Appellant.

On Appeal from the District Court  
for the District of New Jersey  
(D.C. Civil Action No. 92-cv-03150)

Argued on July 17, 1997

Before: SLOVITER, Chief Judge, ROTH and  
MICHEL, 1 Circuit Judges

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1. Honorable Paul R. Michel, United States Court of Appeals for the  
Federal Circuit, sitting by designation.

(Opinion filed October 17, 1997)

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OPINION OF THE COURT

ROTH, Circuit Judge.

The Kannankerils, Dr. Mary Kannankeril, her husband, Charles, and their children, Charlene and Crystal, sued a pest exterminator, the Terminix International Company L.P. ("Terminix"), seeking damages for injuries allegedly arising out of the application of pesticides to their residence. The district court found the opinion of Dr. Benjamin Gerson, the medical expert of Dr. Mary Kannankeril, to be unreliable and unsupported by facts. Having excluded Dr. Gerson's opinion, the district court held that Dr. Kannankeril had failed to produce any evidence that her cognitive impairment had been caused by exposure to pesticides applied by Terminix. The court granted summary judgment in favor of Terminix. The admissibility of Dr. Gerson's opinion is the sole issue on which the Kannankerils have appealed. They argue that the district court erroneously excluded the testimony of Dr. Gerson.

We conclude that the district court improperly exercised its gatekeeping role by excluding Dr. Gerson's testimony.

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Accordingly, we will vacate that portion of the order of the district court, granting summary judgment against Dr. Mary Kannankeril on this point, and we will remand this case for further proceedings consistent with this opinion.<sup>2</sup>

I. BACKGROUND

The Kannankerils entered into a one-year contract with Terminix on May 30, 1989, for the control of carpenter ants through the application of pesticides to certain interior portions and the outside deck of the Kannankerils' residence. From May 31, 1989, through October 5, 1990, Terminix treated the Kannankeril residence on at least twenty occasions at intervals ranging from once a month to

twice in a three day period. Terminix applied pesticides, containing Dursban, until the Kannankerils canceled the service on October 5, 1990.

Dursban, the active ingredient in certain pesticides used by Terminix, is a formulation of chlorpyrifos, an organophosphate poison. The organophosphates kill insects by inhibiting the normal breakdown of acetylcholine, which functions as a neurotransmitter in several life forms, including humans. The Kannankerils argue that despite the well-known chronic effects of chlorpyrifos, Dursban was sprayed excessively and improperly in their home. For example, Dursban was sprayed on the cooking range, around the dishwasher, and on the baseboard heater. Dursban was also sprayed in cupboards where pots and pans were stored. Terminix, however, claims that any liquid pesticide that was applied consisted almost entirely of water, with minute concentrations of liquid pesticide added to make the final active solution.

The Kannankerils' suit against Terminix involved alleged injury to Dr. Mary Kannankeril, a former Medical Director of Psychiatric Emergency Services at Saint Mary's Hospital in Passaic, New Jersey. Dr. Kannankeril claims to suffer wide-ranging physiological and cognitive symptoms from

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2. Our decision, vacating the summary judgment against Dr. Kannankeril, is without prejudice to any motion for summary judgment on other grounds which Terminix may bring.

exposure to the pesticides, including Dursban, applied by Terminix.<sup>3</sup> The symptoms first appeared in August 1990, over one year after Terminix began its service. The Kannankerils did not relate Dr. Kannankeril's symptoms with Terminix's ongoing pesticide applications until October 1990. After the entire family developed a rash, the Kannankerils began to suspect Dursban as the cause of their problems. When the Kannankerils complained of a strong odor in their home after the last application, Terminix sent Service Master to clean the Kannankerils' residence. In July 1991, nine months after the last application of pesticide, the Kannankerils requested that the New Jersey Department of Environmental Protection ("DEP") test their residence for the existence of pesticides. The DEP collected air samples from the residence on July 10, 1991. An analysis of the samples indicated non-detectable levels of pesticides.

Dr. Kannankeril allegedly developed chronic toxicity

related to exposure to chlorpyrifos and became sensitized to multiple other chemicals so that further exposure to organophosphates would result in disabling physical problems. As a result of her ill health, she gave up her hospital position in March, 1993, and now sees patients only in an office at home.

Plaintiffs named Dr. Benjamin Gerson, M.D., to testify as a medical expert to establish that exposure to Dursban caused Dr. Kannankeril's injury.<sup>4</sup> Dr. Gerson provided the following opinion:

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3. Only the causation of Dr. Kannankeril's cognitive impairment remains an issue in the case. These cognitive deficits include memory loss, concentration loss, sleeplessness, general anxiety, and headaches. Her other alleged physical symptoms included insomnia, numbness, muscle twitching, pain in muscles and joints, vaginal bleeding, urinary incontinence, nausea, skin rashes, and depigmentation patches throughout her body.

4. Dr. Gerson's qualifications included: Physician certified by the American Board of Toxicology and the American Board of Pathology; Director of the Boston University School of Medicine's Laboratory of Analytical Toxicology and Director of the Research Data Worldwide Clinical Laboratory; Consultant to the Food and Drug Administration's

The temporal relationship and the nature of her complaints lead me to conclude that with reasonable medical certainty, the cause of Dr. Kannankeril's Central Nervous System manifestations of toxicity is exposure to Dursban in 1989 to 1990.

App. at 51.5 Dr. Gerson is the only medical expert proffered by the Kannankerils on causation and his opinion is limited to the causation of Dr. Kannankeril's cognitive impairment. His findings are based on Dr. Kannankeril's account of her cognitive symptoms and on a report prepared by Dr. Ellen Grober, a neuropsychologist who examined Dr. Kannankeril. Dr. Gerson also relied on a summary report of the times and amounts of Dursban applications to the Kannankeril home as well as on his general experience and readings, general medical knowledge, standard textbooks, and standard references.

## II. STANDARD OF REVIEW

A district court's ruling on admissibility of expert testimony is reviewed for abuse of discretion. *Government of the Virgin Islands v. Sanes*, 57 F.3d 338, 341 (3d Cir.

1995); *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 749 (3d Cir. 1994). To the extent that the district court's ruling turns on interpretation of the Federal Rules of Evidence,

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5. Under New Jersey law, medical expert testimony must be made with a reasonable degree of certainty. See *Bondi v. Pole*, 246 N.J. Super. 236 (App. Div. 1991); *Vuocolo v. Diamond Shamrock Chemical Co.*, 240 N.J. Super. 289 (App.Div. 1990); *Johnesee v. The Stop & Shop Companies*, 174 N.J. Super. 426 (App.Div. 1980). New Jersey's rule should govern in the present case since it is a substantive law that is part of the appellants' burden of proof. See *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 752 (3d Cir. 1994).

our review is plenary. *United States v. Velasquez*, 64 F.3d 844, 848 (3d Cir. 1995); *Paoli*, 35 F.3d at 749. We review the district court's findings of fact under a clearly erroneous standard. *Velasquez*, 64 F.3d at 848.

### III. DISCUSSION

#### A. Standard of Admissibility for Expert Testimony

Under the Federal Rules of Evidence, it is the role of the trial judge to act as a "gatekeeper" to ensure that any and all expert testimony or evidence is not only relevant, but also reliable. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 589. (1993). The Rules of Evidence embody a strong and undeniable preference for admitting any evidence which has the potential for assisting the trier of fact. See *Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 780 (3d Cir. 1996). Rule 702, which governs the admissibility of expert testimony, has a liberal policy of admissibility. See *Holbrook*, 80 F.3d at 780; *Paoli*, 35 F.3d at 741.

Rule 702 has three major requirements: (1) the proffered witness must be an expert; (2) the expert must testify about matters requiring scientific, technical or specialized knowledge; and (3) the expert's testimony must assist the trier of fact. See *Paoli*, 35 F.3d at 741-42. The issue of this appeal involves the second requirement of the expert's

testimony. In interpreting this second requirement, we have concluded that "an expert's testimony is admissible so long as the process or technique the expert used in formulating the opinion is reliable." *Id.* at 742 (citing *Daubert*, 113 S.Ct. at 2794-95). In order for the expert testimony to be "reliable," we have required that the testimony be based on the "methods and procedures of science," rather than on "subjective belief or unsupported speculation." *Paoli*, 35 F.3d at 744. Moreover, *Daubert* does not set up a test of which opinion has the best foundation, but rather whether any particular opinion is based on valid reasoning and reliable methodology. Admissibility decisions focus on the expert's methods and reasoning; credibility decisions arise after admissibility has been determined. See *Paoli*, 35 F.3d at 743-46.

There are several factors that a district court should take into account in evaluating whether a particular scientific methodology is reliable. See *Paoli*, 35 F.3d at 742.6 Although these factors are neither exhaustive nor applicable in every case, they provide a convenient starting point for analyzing the opinion of Dr. Gerson. Our inquiry focuses on principles and methodology and not on the conclusions they generate. *Id.* at 744. The analysis of the conclusions themselves is for the trier of fact when the expert is subjected to cross-examination. *Id.* The *Kannankerils* needed to demonstrate by a preponderance of evidence only that Dr. Gerson's opinion was based on "good grounds." *Id.*

#### B. Reliability of Dr. Gerson's Testimony

The district court refused to admit Dr. Gerson's testimony because of insufficient factual foundation to prove that the cause of Dr. Kannankeril's cognitive impairment was exposure to Dursban. We conclude, however, that Dr. Gerson's opinion meets the requirements for the admission of expert testimony under Rule 702 of the Federal Rules of Evidence, as set forth in *Daubert* and interpreted by us in *Paoli*.

##### 1. Differential Diagnosis

In its opposition to Dr. Gerson's testimony, Terminix has

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6. These nonexclusive guidelines, drawn from *Daubert* and this Court's opinion in *United States v. Downing*, 753 F.2d 1223 (3d Cir. 1985), include:

(1) whether a method consists of a testable hypothesis; (2) whether the method has been subject to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put.

Paoli, 35 F.3d at 742 n.8.

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emphasized that Dr. Gerson did not himself perform any diagnostic medical tests. Terminix argues that Dr. Gerson did not employ sufficient diagnostic techniques to have good grounds for his conclusions or to have properly performed a differential diagnosis. We have recognized "differential diagnosis" as a technique that involves assessing causation with respect to a particular individual. Paoli, 35 F.3d at 758. Differential diagnosis is defined for physicians as "the determination of which of two or more diseases with similar symptoms is the one from which the patient is suffering, by a systematic comparison and contrasting of the clinical findings." STEDMAN'S MEDICAL DICTIONARY 428 (25th ed. 1990). The elements of a differential diagnosis may consist of the performance of physical examinations, the taking of medical histories, and the review of clinical tests, including laboratory tests. A doctor does not have to employ all of these techniques in order for the doctor's diagnosis to be reliable. See Paoli, 35 F.3d at 759. A differential diagnosis may be reliable with less than all the types of information set out above. See *id.* Indeed, as we held in Paoli, "to the extent that the district court concluded otherwise [i.e., that a differential diagnosis made on less than all types of information cannot be reliable], we hold that it abused its discretion." *Id.*

Depending on the medical condition at issue and on the clinical information already available, a physician may reach a reliable differential diagnosis without himself performing a physical examination, particularly if there are other examination results available. In fact, it is perfectly acceptable, in arriving at a diagnosis, for a physician to rely on examinations and tests performed by other medical practitioners.

These principles are applicable to the admissibility of Dr. Gerson's expert opinion regarding Dr. Kannankeril. The district court found that Dr. Gerson never performed any



clinical tests to support his opinion of causation. Dr. Gerson did not "examine, or even speak to" Dr. Kannankeril. Instead, Dr. Gerson reviewed the records of Dr. Kannankeril's medical history. Dr. Gerson also relied on Dr. Grober's report of Dr. Kannankeril's neuropsychological complaints and of her cognitive impairment. Terminix does

not claim that the medical records relied upon by Dr. Gerson were incomplete or inaccurate. As noted by this Court in Paoli, "evaluation of the patient's medical records is a reliable method of concluding that a patient is ill even in the absence of a physical examination." Id. at 762. A doctor needs only one reliable source of information showing that a plaintiff is ill; either a physical test or medical records will suffice for this. Id. at 762. For these reasons, the reliability of Dr. Gerson's opinion is not necessarily diminished by the fact that he himself did not perform a physical examination.

Moreover, in making his evaluation, Dr. Gerson was aware that one test, the cholinesterase blood test, did not produce abnormal results. The district court noted that the blood test for cholinesterase levels is "the most accepted test method for determining exposure to Dursban." However, the cholinesterase test result is but one of the factors considered by Dr. Gerson. Despite the negative results from this test, Dr. Gerson still opined that, as a matter of reasonable medical certainty, Dursban had caused Dr. Kannankeril's cognitive impairment. It is for the jury to decide whether a single cholinesterase test, yielding results within normal limits, outweighs the other factors relied upon by Dr. Gerson and undermines his opinion. This is an issue of credibility, not of admissibility.

Furthermore, we do not agree with the trial court's finding that "every" objective medical test showed normal results. The cholinesterase test was not the only clinical test performed on Dr. Kannankeril. Dr. Grober, the neuropsychologist at the Albert Einstein Medical Center, confirmed a diminution in Dr. Kannankeril's cognitive abilities.

In attacking the differential diagnosis performed by the plaintiff's expert, the defendant may point to a plausible cause of the plaintiff's illness other than the defendant's actions. It then becomes necessary for the plaintiff's expert to offer a good explanation as to why his or her conclusion remains reliable. Paoli, 35 F.3d at 762. Dr. Gerson, however, was never challenged by the presentation of alternate diagnoses by other physicians. Moreover,

Terminix, in challenging Dr. Gerson's opinion, has not

raised any other theory of causation for Dr. Kannankeril's cognitive impairment.<sup>7</sup> The record in this case is devoid of any alternate diagnosis which Dr. Gerson ignored or failed to consider.

Furthermore, we reject Terminix's argument that Dr. Gerson admitted to alternate causes other than exposure to Dursban for Dr. Kannankeril's condition. Dr. Gerson had testified at his deposition that something other than exposure to organophosphates "could" have caused each of the individual symptoms displayed by Dr. Kannankeril. While, however, an alternate explanation for each of Dr. Kannankeril's individual symptoms may exist separately, Dr. Gerson concluded with reasonable medical certainty that Dursban was the most likely cause of her condition as a whole. Terminix's exploration of the cause of each individual symptom goes not to the admissibility of the evidence but to its weight.

## 2. Degree of Exposure

The Kannankerils also contend that the district erred in finding that Dr. Gerson had no knowledge of Dr. Kannankeril's degree of exposure to Dursban. According to the district court, Dr. Gerson did not know the levels of Dursban at the Kannankerils' home at the time of exposure, and he did not know the amount of time plaintiffs spent in the home. We conclude, however, that the district court erred when it failed to recognize that Dr. Gerson had sufficient knowledge of exposure from his review of Terminix's application records, showing when, how much, and where pesticide had been applied.

Terminix asserts, however, that these application records are "unreliable as a matter of law as a tool" to determine Dr. Kannankeril's exposure. The trial court agreed and ruled that the only information reviewed by Dr. Gerson which addressed actual levels of pesticides in the

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7. Terminix had, of course, no obligation to present an alternate theory of causation in its effort to have Dr. Gerson's opinion excluded. However, in determining whether a proper differential diagnosis was conducted, a consideration of other diagnoses may be relevant.

Kannankeril home was the analysis performed by the DEP in July 1991, nine months after the last application of Dursban. The results of that sampling indicated non-detectable levels of pesticides.

We find that Terminix's assertion is without merit. First, there is no expert opinion in the record to establish that an ambient air test, particularly an ambient air test performed nine months after the final application of Dursban, is the only appropriate way in this case to gauge exposure to the organophosphate. Moreover, the plaintiffs were prepared to offer into evidence the Dursban product label which contained warnings such as: "HARMFUL IF SWALLOWED . HARMFUL IF ABSORBED THROUGH SKIN . CAUSES EYE AND SKIN IRRITATION" and "Thoroughly wash dishes and food handling utensils with soap and water if they become contaminated by application of this product. Do not allow children or pets to contact treated surfaces until spray has dried." App. at 241-43. Under the facts as presented in this case, the district judge erred in ruling that an expert may rely only on the ambient air test to determine whether Dr. Kannankeril had been exposed to Dursban. Instead, all factual evidence of the presence of the chemicals in the residence should be relevant in forming an expert opinion of causation.

We conclude that it is for the trier of fact to determine what weight to give the ambient air test results as an indication of exposure. See *Joiner v. General Elec. Co.*, 78 F.3d 524, 534 (11th Cir. 1996) (reversing exclusion of expert opinions that plaintiffs' exposure to certain chemicals caused his lung cancer where there were issues of fact whether plaintiff was actually exposed to the chemicals so that summary judgment based on a finding of no exposure was inappropriate). The issue whether an ambient air test should be given more weight than pesticide application records goes to the weight rather than the admissibility of evidence. See *United States v. Velasquez*, 64 F.3d 844, 848 (3d Cir. 1995) (citing *United States v. Jakobetz*, 955 F.2d 786, 800 (2d Cir. 1992)). The trial judge must be careful not to mistake credibility questions for admissibility questions.

### 3. Peer Review and Publication

Two other factors that a district court can take into account in assessing reliability are peer-review and publication. They may not, however, in every case be necessary conditions of reliability. See *Daubert*, 509 U.S. at

593; Paoli, 35 F.3d at 742. In the instant case, Dr. Gerson admitted that he has not produced any publication on organophosphates. Because the toxic effects of organophosphates on humans are well recognized by the scientific community, however, Dr. Gerson's opinion is not a novel scientific theory regarding organophosphates.<sup>8</sup> Instead, Dr. Gerson merely reported that Dr. Kannankeril exhibited the "signs and symptoms of chronic toxicity related to exposure to chlorpyrifos (Dursban)." Thus, although Dr. Gerson did not write on the topic, his opinion is supported by widely accepted scientific knowledge of the harmful nature of organophosphates. See also McCulloch v. H.B. Fuller Co., 61 F.3d 1038, 1042 (2d Cir. 1995) (holding that peer review and publication or general acceptance of an expert's theory goes to the weight of the testimony rather than its admissibility).

Based on the record before us, we conclude that Dr. Gerson's opinion on causation has a factual basis and supporting scientific theory. Dr. Gerson based his opinion on Dr. Kannankeril's medical records, Dr. Grober's reports confirming her medical condition, and Terminix's application receipts. He also relied on general experience and readings, general medical knowledge, standard textbooks, and standard references. After considering all the relevant facts, Dr. Gerson reported that "[t]he temporal relationship and the nature of her complaints lead me to conclude that with reasonable medical certainty, the cause of Dr. Kannankeril's Central Nervous System manifestations of toxicity is exposure to Dursban in 1989 to 1990." App. at 51. Dr. Gerson's testimony is neither conjecture nor speculation. His opinion was clearly stated to a reasonable degree of medical certainty.

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8. It is an acknowledged scientific fact that chlorpyrifos, the active ingredient in Dursban, is harmful to humans and can cause the very symptoms displayed by Dr. Kannankeril.

Whether the appellants' expert might have done a better job is not the test. We have stated that "it is an abuse of discretion to exclude testimony simply because the trial court does not deem the proposed expert to be the best qualified or because the proposed expert does not have the specialization that the court considers most appropriate." Holbrook, 80 F.3d at 782. If the expert meets liberal minimum qualifications, then the level of the expert's expertise goes to credibility and weight, not admissibility. See Paoli, 35 F.3d at 741. The Second Circuit addressed a similar issue and commented that the expert's alleged

shortcomings were raised properly on cross-examination and went to the credibility, not the admissibility, of his testimony. McCulloch, 61 F.3d 1038, 1043 (2d Cir. 1995). Consequently, we reject Terminix's suggestion that Dr. Gerson must be a specialist in Dursban to provide expert testimony on the causation of Dr. Kannankeril's injury.

The Kannankerils' burden is only to provide an expert opinion that is relevant and reliable and that will assist the trier of fact. As we have repeated above, issues of credibility arise after the determination of admissibility. Credibility is for the jury. We conclude that, under the facts presented here, the district court erred in ruling that Dr. Gerson's expert testimony on causation was inadmissible.

#### IV. CONCLUSION

For the foregoing reasons, we hold that the district court erred as a matter of law in refusing to permit Dr. Gerson to testify as to his opinion of the causation of Dr. Kannankeril's illness. Accordingly, we will vacate that portion of the district court order which granted summary judgment against Dr. Mary Kannankeril, and we will remand this case for further proceedings consistent with this opinion.

A True Copy:  
Teste:

Clerk of the United States Court of Appeals  
for the Third Circuit